

REMARKS

Foreign Priority

The acknowledgement, in the Office Action, of a claim for foreign priority under 35 U.S.C. § 119(a)-(d), and that the certified copy of the priority document has been received, is noted with appreciation.

Status Of Application

Claims 1-15 are pending in the application. By this Amendment, claims 2, 3 and 7 have been cancelled, and claims 16 and 17 have been added. The status of the remaining claims is as follows:

Claims 1, 4-6, 8, 10-12, and 14 are rejected under 35 USC § 102(e) as being anticipated by U.S. Patent No. 5,726,679 to Kanno et al. (hereinafter the "Kanno patent");

Claims 9 and 13 are rejected under 35 USC § 103(a) as being unpatentable over the Kanno patent in view of U.S. Patent No. 5,657,141 to Terada et al. (hereinafter the "Terada patent"); and

Claim 15 is rejected under 35 USC § 103(a) as being unpatentable over the Kanno patent in view of U.S. Patent No. 6,285,391 to Shibata et al. (hereinafter the "Shibata patent").

Drawings

To date, no Notice of Draftsperson's Patent Drawing Review has been received. Applicants respectfully request receipt of this document when it becomes available.

35 U.S.C. § 102(e) Rejection

Claims 1, 4-8, 10-12, and 14

The rejection of claims 1, 4-6, 8, 10-12, and 14 under 35 USC § 102(e), as being anticipated by the Kanno patent, is respectfully traversed based on the following.

Claims 4 and 5 depend from claim 1; claims 8 and 10 depend from claim 6; and claims 12 and 13 depend from claim 11. Accordingly, a review of claims 1, 6 and 11 is essential to an analysis of the Section 102 rejection of claims 1, 4-6, 8, 10-12, and 14.

Claim 1 requires an information display apparatus comprising a liquid crystal material exhibiting, at room temperature, a cholesteric phase in which the liquid crystal material has a bistability between a focal-conic state and a planar state in which the liquid crystal material exhibits a selective reflection characteristic. This feature is not disclosed or suggested by the Kanno patent. In fact, the Kanno patent discloses a device wherein ferroelectric liquid crystal is used in the display device, and does not disclose or suggest a liquid crystal material exhibiting, at room temperature, a cholesteric phase in which the liquid crystal material has a bistability between a focal-conic state and a planar state. Thus, claim 1 is distinguished and nonobvious over the Kanno patent.

Claims 4 and 5 depend from claim 1, therefore, claims 4 and 5 are also distinguished and nonobvious over the Kanno patent.

Claim 6 requires an information display apparatus comprising a display having a first display area and a second display area each of which comprises a plurality of scan electrodes and a plurality of data electrodes, wherein the first display area and the second display area are driven by a first driving method and a second driving method, respectively; and the first driving method and the second driving method are different from each other in that a waveform applied to a selected one of the scan electrodes of the first display area is different from a waveform applied to a selected one of the scan electrodes of the second display area.

The Kanno patent does not disclose or suggest a device with a first display area driven by a first driving method and a second display area driven by a second driving method wherein the first driving method and the second driving method which are different from each other in that a waveform applied to a selected one of scan electrodes of the first display area is different from a waveform applied to a selected one of scan electrodes of the second display area. Although the Kanno patent discloses a first scanning electrode selection signal in one embodiment and a second scanning electrode

selection signal in another embodiment, the Kanno patent does not disclose or suggest a first display area driven by a first driving method and a second display area driven by a second driving method wherein the first driving method and the second driving method are different from each other in that a waveform applied to a selected one of scan electrodes of the first display area is different from a waveform applied to a selected one of scan electrodes of the second display area. As this feature is a requirement of claim 6, claim 6 is not anticipated by the Kanno patent.

Claims 7, 8, and 10 depend from claim 6. Therefore, because claim 6 is not anticipated by the Kanno patent, claims 7, 8, and 10 are also not anticipated by the Kanno patent.

Claim 11 requires an information display apparatus comprising a first display which displays an image by using a first displaying method; and a second display which displays an image by using a second displaying method, the second display being a reflective type liquid crystal display and being capable of keeping the image thereon without consuming electric power; wherein the first display is of a different type from the second display. Thus, according to claim 1, one display is a reflective type liquid crystal display and the other display is of a type different from a reflective type liquid crystal display. In contrast, the Kanno patent does not disclose a device having a display that is a reflective type liquid crystal display. In fact, as is apparent from the presence of polarizers 143 and 148 above and below the cell in Fig. 14B of the Kanno patent, the Kanno device relates to a transmitting type display, and thus, fails to disclose or suggest a reflective type display. Therefore, the Kanno patent does not anticipate claim 11.

Claims 12 and 14 depend from claim 11. Therefore, each of claim 12 and claim 14 is not anticipated by the Kanno patent.

Accordingly, it is respectfully requested that the rejection of claims 1, 2, 4-8, 10-12, and 14 under 35 U.S.C. § 102(e), as being anticipated by the Kanno patent, be reconsidered and withdrawn.

35 U.S.C. § 103(a) Rejections

Claim 1 over the combination of the Kanno patent and the Terada patent

The rejection of claim 3 as being obvious over the combination of the Kanno patent and the Terada patent, will now be addressed with respect to claim 1, as the feature of claim 3 has been incorporated into claim 1.

With regard to the requirement of claim 1 that a liquid crystal material exhibits a cholesteric phase at room temperature, the Office Action states that although the Kanno patent does not specifically teach a cholesteric phase at room temperature, the Terada patent teaches liquid crystal having a cholesteric phase at room temperature; and therefore, the combination of the Kanno patent and the Terada patent renders the claim obvious. However, contrary to the statement in the Office Action, the Terada patent does not disclose or suggest liquid crystal material which exhibits a cholesteric phase, at room temperature, that has a bistability between a focal-conic state and a planar state. The Office Action cites column 18, lines 35-42 of the Terada patent as disclosing a liquid crystal having a cholesteric phase at room temperature. Column 18, lines 35-42 of the Terada patent describes that several liquid crystal compositions were cooled to 30 degrees C providing chiral smectic C phase through phases including cholesteric phase and smectic A phase. However, 30 degrees C (approximately 86 degrees F), which represents the minimum temperature to which each of the liquid crystal materials were cooled, is greater than room temperature. Therefore, the Terada patent does not disclose or suggest a liquid crystal material exhibiting, at room temperature, a cholesteric phase in which the liquid crystal material has a bistability between a focal-conic state and a planar state.

Therefore, both the Kanno patent and the Terada patent fail to disclose or suggest a liquid crystal display comprising liquid crystal material exhibiting, at room temperature, a cholesteric phase in which the liquid crystal material has a bistability between a focal conic state and a planar state. As this feature is a requirement of claim 1, claim 1 could not be rendered obvious by any combination of the Kanno patent and the Terada patent.

Claims 9 and 13

The rejection of claims 9 and 13 under 35 U.S.C. § 103(a), as being unpatentable over the Kanno patent in view of the Terada patent, is respectfully traversed based on the following.

Claim 9 depends from independent claim 6. As the previous arguments have shown, the Kanno patent does not disclose or suggest a first display area driven by a first driving method and a second display area driven by a second driving method wherein the first driving method and the second driving method are different from each other in that a waveform applied to a selected one of scan electrodes of the first display area is different from a waveform applied to a selected one of scan electrodes of the second display area. The Terada patent does not make up for this deficient portion of the Kanno patent. Specifically, like the Kanno patent, the Terada patent also does not disclose or suggest a first display area driven by a first driving method and a second display area driven by a second driving method wherein the first driving method and the second driving method are different from each other in that a waveform applied to a selected one of scan electrodes of the first display area is different from a waveform applied to a selected one of scan electrodes of the second display area. Therefore, claim 6 is distinguished and nonobvious over any of the Kanno patent, the Terada patent, or any combination of the two. As claim 9 depends from claim 6, claim 9 is also distinguished and nonobvious over any of the Kanno patent, the Terada patent, or any combination of the two.

Claim 13 depends from claim 11. As shown in the previous argument for claim 11 over the Kanno patent, the Kanno patent fails to disclose or suggest all of the requirements of claim 11. In particular, the Kanno patent does not disclose or suggest a display apparatus having two displays wherein one of the displays is of a reflective type. Therefore, claim 13 is distinguished and nonobvious over the Kanno patent.

Similarly, the second reference, the Terada patent also fails to disclose or suggest a display apparatus having two displays wherein one of the displays is of a reflective type. Thus, both the Kanno patent and the Terada patent fail to disclose a display apparatus

having two displays wherein one is of a reflective type and the other is of a different type. Therefore, claim 11 is distinguished and nonobvious over any of the Kanno patent, the Terada patent, or any combination of the two. As claim 13 depends from claim 11, claim 13 is also distinguished and nonobvious over any of the Kanno patent, the Terada patent, or any combination of the two.

Accordingly, it is respectfully requested that the rejection of claims 9 and 13 under 35 U.S.C. § 103(a), as being unpatentable over the Kanno patent in view of the Terada patent, be reconsidered and withdrawn.

Claim 15

The rejection of claim 15 under 35 USC § 103(a), as being unpatentable over the Kanno patent in view of the Shibata patent, is respectfully traversed based on the following.

Claim 15 depends from claim 11. As shown in the previous argument for claim 11 over the Kanno patent, the Kanno patent fails to disclose or suggest all of the requirements of claim 11. In particular, the Kanno patent does not disclose or suggest a display apparatus having two displays wherein one is of a reflective type and the other is of a different type. Therefore, claim 11 is distinguished and nonobvious over the Kanno patent.

Similarly, the second reference, the Shibata patent, also fails to disclose or suggest a display apparatus having two displays wherein one is of a reflective type and the other is of a different type. Thus, both the Kanno patent and the Shibata patent fail to disclose a display apparatus having two displays wherein one is of a reflective type and the other is of a different type. Therefore, claim 11 is distinguished and nonobvious over any of the Kanno patent, the Shibata patent, or any combination of the two. As claim 15 depends from claim 11, claim 15 is also distinguished and nonobvious over any of the Kanno patent, the Terada patent, or any combination of the two.

Accordingly, it is respectfully requested that the rejection of claim 15 under 35 USC § 103(a), as being unpatentable over the Kanno patent in view of the Shibata patent, be reconsidered and withdrawn.

New claims 16 and 17

Newly added claim 16 recites:

An information display apparatus comprising:
a display section comprising a first display and a second display stacked on said first display;
a driver section connected to said first display and said second display; and
a control section for controlling said driver section to repeatedly update only a part of said display section, wherein the update of the part is executed so that the first display and the second display are simultaneously driven by the driver section.

None of the cited references, namely, the Kanno patent, the Terada patent, and the Shibata patent discloses or suggests a display apparatus comprising a display section comprising a first display and a second display stacked on the first display and a control section for controlling the driver section to repeatedly update only a part of the display section, wherein the update of the part is executed so that the first display and the second display are simultaneously driven by the driver section. Therefore, new claim 16 is distinguished and nonobvious over any cited references, or any combination of the cited references.

New claim 17 depends from claim 16. Therefore, the reasons stated above with regard to the distinguishing features of claim 16 are equally applicable to claim 17. Therefore, claim 17 is also distinguished and nonobvious over any of the cited references, or any combination of the cited references.

CONCLUSION

Wherefore, in view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment increases the number of independent claims from three to a total of four independent claims, does not increase the total number of claims to a number greater than twenty, and does not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$84.00 to be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260.

Any fee required by this document other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.


If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The following is a marked-up version of the changes to the claims which are being made in the attached response to the Office Action dated February 26, 2002.

IN THE SPECIFICATION:

The paragraph beginning at page 2, line 12, and ending at page 2, line 22:

Thus, practical use of a display which consumes little electric power is demanded. The present inventors have [been] developed displays using chiral nematic liquid crystal. Chiral nematic liquid crystal is bistable and has a memory effect. Accordingly, without application of a voltage, such a display can continue displaying a picture thereon, and it is possible to reduce the consumption of electric power. At present, in order to cause this kind of liquid crystal to make a phase transition, a relatively high voltage is necessary; therefore, a simple matrix driving method, not the active matrix driving method using TFTs, is adopted. Because the simple matrix driving method is adopted, even if the display has a large number of pixels, it is not expensive.

The paragraph beginning at page 5, line 16, and ending at page 9, line 7:

These and other objects and features of the present invention will be apparent from the following description with reference to the accompanying drawings, in which:

Fig. 1 is a schematic structural view of an information display apparatus which is the first embodiment of the present invention;

Fig. 2 is a block diagram which shows a matrix driving circuit of a liquid crystal display employed in the information display apparatus;

Fig. 3 is an illustration which shows display coordinates;

Fig. 4 is an illustration which shows display control;

Fig. 5 is an illustration which shows an exemplary picture on the display;

Fig. 6 is an illustration which shows an example of displaying motion pictures in a plurality of areas;

Fig. 7 is a sectional view of an exemplary liquid crystal display used as the display;

Fig. 8 is a plan view of the liquid crystal display which shows a state wherein a columnar structure and a sealant are formed on a substrate;

Fig. 9 is an illustration which shows a manufacturing process of the liquid crystal display;

Fig. 10 is a graph which shows the relationship between the voltage of a selective signal applied by the driving circuit and the Y value;

Figs. 11a and 11b are charts which [shows] show voltage waveforms applied to a test cell of the liquid crystal display;

Figs. 12a and 12b are charts which show a voltage waveform to drive the liquid crystal display;

Fig. 13 is a block diagram which shows a driving/image processing circuit of the liquid crystal display;

Fig. 14 is a front view of a portable telephone which is the second embodiment of the present invention;

Figs. 15a through 15e are illustrations which show a way of displaying information on the portable telephone;

Fig. 16 is a front view of a PDA which is the third embodiment of the present invention;

Fig. 17 is a side view of the PDA;

Fig. 18 is a schematic sectional view of a lid of the PDA;

Fig. 19 is a front view of a PDA which is the fourth embodiment of the present invention;

Fig. 20 is a schematic sectional view of a lid of the PDA;

Fig. 21 is an illustration which shows a picture displayed on the PDA;

Figs. 22a through 22d are illustrations which show a way of displaying information on the PDA;

Fig. 23 is an illustration which shows another way of displaying information on the PDA;

Fig. 24 is a front view of a mobile type terminal unit which is the fifth embodiment of the present invention;

Figs. 25a and 25b are illustrations which show a way of displaying information on the mobile type terminal unit;

Figs. 26a and 26b are illustrations which show another way of displaying information on the mobile type terminal unit;

Fig. 27 is a front view of a watch type terminal unit which is the sixth embodiment of the present invention;

Figs. 28a and 28b are illustrations which show a way of displaying information on the watch type terminal unit;

Fig. 29 is a front view of an information display apparatus which is the seventh embodiment of the present invention;

Fig. 30 is a schematic sectional view of the information display apparatus which is the seventh embodiment;

Fig. 31 is a front view of an information display apparatus which is the eighth embodiment of the present invention;

Fig. 32 is a schematic sectional view of the information display apparatus which is the eighth embodiment;

Fig. 33 is a schematic sectional view of an information display apparatus which is the ninth embodiment of the present invention;

Fig. 34 is a schematic sectional view of an information display apparatus which is the tenth embodiment;

Fig. 35 is a front view of an electronic book which is the eleventh embodiment of the present invention;

Fig. 36 is a front view of an electronic book which is the twelfth

embodiment of the present invention;

Fig. 37 is a front view of an electronic book which is the thirteenth embodiment of the present invention;

Fig. 38 is a front view of a bulletin board which is the fourteenth embodiment of the present invention;

Fig. 39 is a block diagram of a driving section of an information display apparatus which is the fifteenth embodiment of the present invention;

Fig. 40 is a block diagram of the internal circuit of a first scan driver;

Fig. 41 is a chart which shows driving signal waveforms according to a first driving method;

Fig. 42 is a block diagram of the internal circuit of a second scan driver;

Fig. 43 is a chart which shows driving signal waveforms according to a second driving method;

Fig. 44 is a block diagram of the internal circuit of a data driver;

Fig. 45 is a block diagram of a driving section of an information display apparatus which is the sixteenth embodiment of the present invention;

Figs. 46a and 46b are illustrations which show a way of displaying information on the information display apparatus which is the sixteenth embodiment; and

Fig. 47 is a block diagram of a driving section of an information display apparatus which is the seventeenth embodiment of the present invention.

The paragraph beginning at page 12, line 6, and ending at page 12, line 12:

Fig. 4 shows this control in more detail. Here, the liquid crystal display 100 has 1024 pixels in each row (scan line) and 768 pixels in each

column (data line). Each of the pixels is capable of displaying one [bite] byte of (256) tones or colors. The video memory 40 has 786432 (1024×768) addresses 00000h through CFFFFh, and its capacity is 786432 [bites.] bytes. The liquid crystal display 100 has addresses A0 through A767 in the column direction and addresses B0 through B1023 in the row direction.

The paragraph beginning at page 14, line 20, and ending at page 15, line 1:

In the above-described control, one [bite] byte of data [are] is used for one pixel, but for a display of a full-color image, three [bites] bytes of data are used for one pixel. In this case, although the volume of data to be stored is three times, other processes are performed in the same way. Otherwise, three memories may be provided for the red, green and blue display layers, respectively. In either case, in displaying a motion picture, the display layers are driven simultaneously, which results in a motion picture of a high quality without color dislocation.

The paragraph beginning at page 16, line 13, and ending at page 16, line 19:

Each of the display layers 111R, 111G, and 111B has a resin columnar structure [116,] 115, liquid crystal 116 and spacers 117 between transparent substrates 112 with transparent electrodes 113 and 114, respectively, thereon. On the transparent electrodes 113 and 114, an insulating layer 118 and an alignment controlling layer 119 are provided if necessary. A sealant 120 is provided on the periphery of the substrates 112 to seal the liquid crystal 116 in the substrates 112.

The paragraph beginning at page 25, line 20, and ending at page 26, line 9:

In the liquid crystal display 100, the display state of the liquid crystal is a function of the voltage applied and the pulse width. By

resetting the whole liquid crystal to the focal-conic state wherein the liquid crystal shows the lowest Y value (luminous reflectance) and thereafter, applying a pulse voltage with a constant pulse width to the liquid crystal, the display state of the liquid crystal changes as Fig. 10 shows. In the graph of Fig. 10, the y-axis indicates the Y value, and the x-axis indicates the voltage applied. When a pulse voltage V_p is applied, the liquid crystal comes to the planar state wherein the liquid crystal shows the highest Y value, and when a pulse voltage V_f is applied, the liquid crystal comes to the focal-conic state wherein the liquid ~~[crystla]~~ crystal shows the lowest Y value. Also, when an intermediate pulse voltage between V_p and V_f is applied, the liquid crystal comes to an intermediate state between the planar state and the focal-conic state wherein the liquid crystal shows an intermediate Y value, and thus, a display of an intermediate color is possible.

The paragraph beginning at page 34, line 4, and ending at page 34, line 14:

The display section of the sixth embodiment is basically the same as that of the fifth embodiment. Here, [a further] another way of displaying information on the display section is described. As Fig. 28a shows, when "current position" is inputted on the second display 332, a map and a mark A indicating the current position are displayed on the first display 331. The words "current position" are written on the second display 332 immediately but are erased soon for energy saving. It takes a relatively long time to write a map on the first display 331. Once the map is written, however, it is continuously displayed even after stoppage of supply of electric power, which reduces the consumption of electric power.

The paragraph beginning at page 35, line 26, and ending at page 36, line 10:

A TFT liquid crystal display requires only a short time for writing and is suited to display a motion picture. It is, however, difficult to produce

a TFT liquid crystal display with a large screen, and production of a large-sized TFT liquid crystal display [costs much.] is expensive. In the seventh embodiment, therefore, a large screen is made of cholesteric liquid crystal or chiral nematic liquid crystal which can be easily structured into a large-sized display. By using the respective advantages of the displays 351 and 352 and compensating the respective disadvantages of the displays 351 and 352 with each other, shortening of the writing time, enlarging of the screen, reduction of cost and energy saving can be achieved.

IN THE CLAIMS:

1. (Once Amended) An information display apparatus comprising:
a liquid crystal display [having a plurality of liquid crystal pixels defined by] comprising a liquid crystal material, a plurality of scan electrodes and a plurality of data electrodes, said liquid crystal material exhibiting, at room temperature, a cholesteric phase in which said liquid crystal material has a bistability between a focal-conic state and a planar state in which said liquid crystal material exhibits a selective reflection characteristic, said scan electrodes and said data electrodes defining a plurality of liquid crystal pixels;

a driver comprising a scan electrode driver and a data electrode driver, said scan electrode driver including a shift register and a plurality of output terminals [which is] respectively connected to said scan [electrodes and] electrodes, said data electrode driver including a shift register and a plurality of output terminals respectively connected to said data electrodes to drive said liquid crystal display; and

a controller which is connected to said driver, said controller being capable of controlling said driver to repeatedly select only part of scan electrodes by controlling the shift register of the scan electrode driver to perform writing on only part of the pixels of the liquid crystal display corresponding to the selected scan electrodes.

4. (Once Amended) [The] An information display apparatus according to claim 1, wherein said controller controls said driver based on motion picture data.

5. (Once Amended) [The] An information display apparatus according to claim 1, wherein said controller sends data regarding a writing start line and a writing end line to said driver.

6. (Once Amended) An information display apparatus comprising:
a display having a first display area and a second display area each of which [are different from each other in time required for writing thereon.] comprises a plurality of scan electrodes and a plurality of data electrodes, wherein:

said first display area and the second display area are driven by a first driving method and a second driving method, respectively; and

said first driving method and said second driving method are different from each other in that a waveform applied to a selected one of said scan electrodes of the first display area is different from a waveform applied to a selected one of said scan electrodes of the second display area.

8. (Once Amended) [The] An information display apparatus according to claim 6, wherein said first display area is capable of displaying an image with a first contrast, and said second display area is capable of displaying an image with a second contrast.

9. (Once Amended) [The] An information display apparatus according to claim 6, wherein said first display area is capable of displaying an image with three or more tones, and said second display area is capable of displaying an image with two tones.

10. (Once Amended) [The] An information display apparatus according to claim 6, wherein said first display area and said second display area display images with mutually different dot sizes, respectively.

11. (Once Amended) An information display apparatus comprising:
a first display which displays an image by using a first displaying method; and
a second display which displays an image by using a second displaying method,
said second display being a reflective type liquid crystal display and being capable of

keeping the image thereon without consuming electric [power.] power;
wherein the first display is of a different type from said second display.

12. (Once Amended) [The] An information display apparatus according to claim 11, wherein a display area of said second display is larger than that of said first display.

13. (Once Amended) [The] An information display apparatus according to claim 11, wherein said second display has a liquid crystal material which exhibits a cholesteric phase at a room temperature.

14. (Once Amended) [The] An information display apparatus according to claim 11, wherein said first display and said second display overlap each other.

15. (Once Amended) [The] An information display apparatus according to claim 11, wherein said first display is detachable from said information display apparatus.

16. (New) An information display apparatus comprising:
a display section comprising a first display and a second display stacked on said first display;
a driver section connected to said first display and said second display; and
a control section for controlling said driver section to repeatedly update only a part of said display section, wherein the update of the part is executed so that the first display and the second display are simultaneously driven by the driver section.

17. (New) An image forming apparatus according to claim 16, wherein said first display and said second display are respectively for display a first color and a second color that is different from the first color.

Claims 2, 3, and 7 have been cancelled.